Osseous pseudoprogression

Osseous pseudoprogression on MR imaging can mimic true progression in lesions treated with spine stereotactic radiosurgery.

Taylor and Weaver, report the first description of pseudoprogression involving spinal metastases in the literature and aim to alert the treating physician to this clinical situation. Unlike brain tumor pseudoprogression, spine tumor pseudoprogression is a relatively early posttreatment phenomenon, measured in days to 2 months. The acute inflammatory response associated with tumor necrosis and disruption of the tumor capillary integrity caused by radiotherapy is an important component in the development of pseudoprogression. Future studies will be fundamental in assigning clinical significance, defining the incidence and predictors, and affecting future management of this phenomenon [1].

Case series

From the initial set of 223 patients, 37 lesions in 36 patients met the inclusion criteria and were selected for secondary analysis. Five of the 37 lesions (14%) demonstrated osseous pseudoprogression, and 9 demonstrated progressive disease. There was a significant association between single-fraction therapy and the development of osseous pseudoprogression (P = .01), and there was a significant difference in osseous pseudoprogression-free survival between single- and multifraction regimens (P = .005). In lesions demonstrating osseous pseudoprogression, time-to-peak size occurred between 9.7 and 24.4 weeks after spine stereotactic radiosurgery (mean, 13.9 weeks; 95% CI, 8.6-19.1 weeks). The peak lesion size was between 4 and 10 mm larger than baseline. Most lesions returned to baseline size between 23 and 52.4 weeks following spine stereotactic radiosurgery.

Progression on MR imaging performed between 3 and 6 months following spine stereotactic radiosurgery should be treated with caution because osseous pseudoprogression may be seen in more than one-third of these lesions. Single-fraction spine stereotactic radiosurgery may be associated with osseous pseudoprogression. The possibility of osseous pseudoprogression should be incorporated into the prospective criteria for assessment of local control following spine stereotactic radiosurgery [2]

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Taylor DR, Weaver JA. Tumor pseudoprogression of spinal metastasis after radiosurgery: a novel concept and case reports. J Neurosurg Spine. 2015 May;22(5):534-9. doi: 10.3171/2014.10.SPINE14444. Epub 2015 Feb 6. PubMed PMID: 25658469.
2)
Amini B, Beaman CB, Madewell JE, Allen PK, Rhines LD, Tatsui CE, Tannir NM, Li J, Brown PD, Ghia AJ. Osseous Pseudoprogression in Vertebral Bodies Treated with Stereotactic Radiosurgery: A Secondary Analysis of Prospective Phase I/II Clinical Trials. AJNR Am J Neuroradiol. 2015 Oct 22. [Epub ahead of print] PubMed PMID: 26494690.